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DISCOVERY IN THE NEOTROPICAL REGION OF A PARASITIC GENUS OF KEROPLATIDAE, *PLANARIVORA* HICKMAN, AND NOTES ON ITS RELATIONSHIPS (DIPTERA, MYCETOPHILOIDEA)

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In the course of the generic revision of the Keroplatidae which I have undertaken, my excellent friend Dr. Nelson Papavero has been kind enough to lend me the material of this family belonging to the Collection of the Museu de Zoologia, São Paulo (Brazil). The bulk of this collection is made up of the material studied by John Lane, who has been the most active worker on the Neotropical Mycetophiloidea since Frederick Wallace Edwards.

Lane has described four species in the subgenus *Cerotelion* of *Keroplatus*. This taxon has since been given generic rank by Matile & Burghele-Balacesco (1969). Accordingly Papavero, in the fascicle 19C, Keroplatidae, of the "Catalogue of the Diptera of the Americas..." (1978), gave the following new combinations: *Cerotelion boracensis* (Lane, 1950), *C. dureti* (Lane, 1958), *C. enderleini* (Lane, 1948) and *C. nigricans* (Lane, 1948). The types of these four species are present in the collection studied. It has been known since Edwards' revision of the group (1929) that two other Neotropical species described in *Cerotelion*, *C. major* Curran and *C. vespiformis* Enderlein, belonged to two other taxa, respectively *Heteropterna* and *Taulyrpa*.

On examining Lane's specimens, it was seen that none of them agreed with the currently accepted concept of *Cerotelion* Rondani, as redefined by Edwards (*op. cit.*). None had the peculiar antennae, widened and strongly compressed, so characteristic of the *Keroplatus* group of genera, nor the large, porrect, last segment of the palpi which distinguishes this group and others from the *Orfelia* group of genera (Lane had noted the rounded flagellum in his original descriptions, but apparently though nothing of this discrepancy with the diagnosis of *Cerotelion*). Moreover, the genitalia of the two species known by males, *C. dureti* and *C. enderleini*, differed strongly form one another in basic sctructure, as did both from the type-species of the genus, *C. lineatus* (F.) and its relatives.

The genitalia of *C. dureti*, as figured by Lane (1958), could evoke the genus *Pyrtaula* Edwards, to which I have long suspected it belonged. It was easy to establish after clearing the head of the holotype in potassium hydroxyde, that it had been referred to *Cerotelion* only because the palpi were broken near the basis, and therefore seemed reduced in the number of palpomeres. The species, wich according to the genitalia seems valid, belongs rightly in *Pyrtaula*, of which it possesses the peculiar gonostyles, simple but long, narrow and curved inwards at apex (comb. n.): *Keroplatus (Cerotelion) dureti* Lane, 1958:147).

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According to my manuscript key of the genera of Keroplatidae, the other three species could fit only in *Planarivora* Hickman; they also checked with almost every detail of the original description of this singular New Zealand genus. My esteemed friend and colleague Dr. Ronald H. Colless (CSIRO, Canberra, Australia) had previously kindly arranged for the loan of a pair of syntypes of the type-species, *P. insignis* Hickman (so named on account of its extraordinary biology), and immediate comparison with the Neotropical types left no doubt that they belong to *Planarivora*. This genus was described only fifteen years ago and based on a species the larvae of which show the unique feature of living as endoparasites of certain land Planarians (*Geoplana*).

According to Hickman (1965), the first instar larva of *Planarivora insignis* penetrates the planarian actively, by means of its poweful mandibles and numerous hook-like prothoracic spines. It then grows very slowly for a period of about eight months. The second instar larva, on the contrary, grows rapidly on the internal organs of its host, which eventually dies. The larva then bites its way out, devours the remains and creeps under a stone or a rotten log. There it spins a pupation nest of threads, as most other Keroplatidae do.

The only discrepancy between the generic diagnosis given by Hickman and the Neotropical species is that, in *P. insignis*, the palpi are said (and illustrated) to be two-segmented, while in the American species, they are distinctly formed of a palpifer and three small palpomeres. In fact, a study of the available syntypes of *P. insignis* reveals that the drawing of the palpi and proboscis given by the author is not very exact. I am of the opinion that the palpi of *P. insignis* consist of a palpifer, a first palpomere entirely membranous and a rounded second palpomere (bearing a large sensory pit which has been illustrated by Hickman). This interpretation is represented in fig. 1. In the Neotropical species, the first palpomere is still sclerotized and the third present, although much smaller than the pit-bearing second (fig. 2).

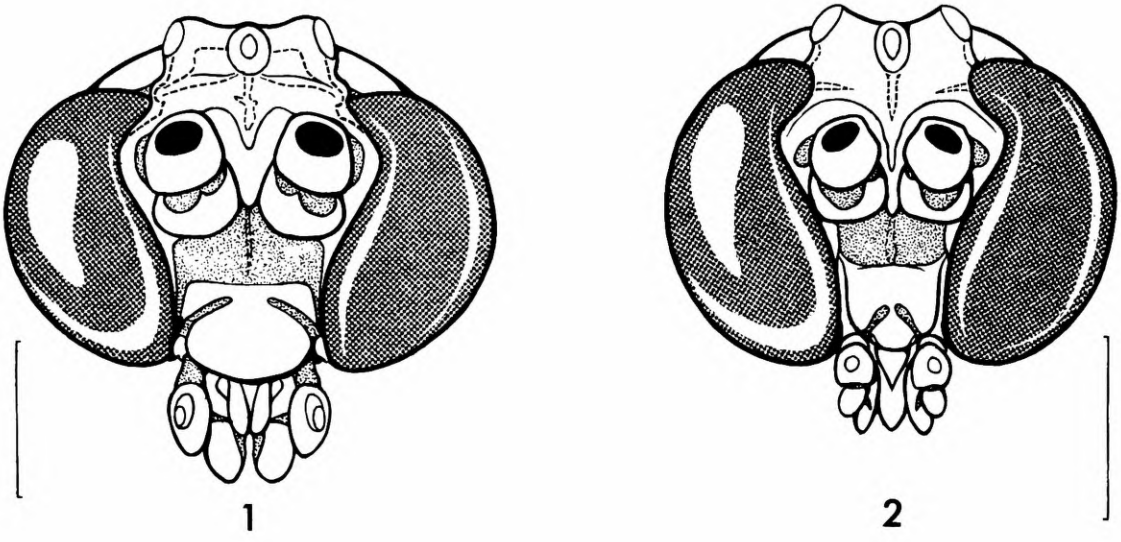

Figure 1. *Planarivora insignis,* head, frontal; figura 2, *P. enderleini,* head, frontal. Scales = 0.3 mm.

This difference in number of palpomeres is of no little importance, and I should have been tempted to erect a distinct subgenus for the Neotropical *Planarivora*, had not the male genitalia been so exactly alike (compare Lane, 1948: fig. 4, and Hickman, 1965: fig. 6). The gonocoxopodites are entirely separated from one another by a membranous area along their length, the styles ventrally inserted, simple and tapering at apex, the aedeagus presents apical rounded lobes and long basal apodemes. All these parts are almost entirely hidden dorsally and laterally by the ninth tergite. This can be inferred as a highly derived type of male genitalia (see Munroe, 1974, for a discussion of the "basic plan" of the male

genitalia in Mycetophiloidea, and the numerous ways of deviation from this plan). These parts being practically identical in the New Zealand and Brazilian species, there appears no reason to treat them as distinct subgenera. The difference in the reduction of the palpi is of a clinal nature, and can be discarded at this level.

The type of genitalia possessed by *Planarivora* checks perfectly with the strongly apomorphous characters I pointed out for the *Asindulum-Xenoplatyura* group of genera (Matile, 1978): hypopygium non-rotatable, aedeagus large, strongly sclerotized and bearing long processes, gonocoxopodites and styles reduced, ninth tergite high and covering laterally the genitalia *s. str.* But nowhere in this group of genera, except in *Planarivora*, are the gonocoxopodites entirely separated. This state of character may be considered secondary and highly apomorphous (with Munroe, I believe the primitive condition to be cylindrical or cylindro-conical gonocoxopodites, separated from one another on most of their length). A more attentive study of the above-mentioned group of genera, and of *Planarivora* as well as some yet undescribed taxa, will have to be done before it is possible to propose an estimation of the phylogenetic relationships of *Planarivora*. We may nevertheless already say that on the basis of the structure of the male genitalia, *Planarivora* is more closely allied to the *Asindulum-Xenoplatyura* group of genera than to any other Keroplatidae.

A crucial point is that while I have considered the apneustism of the mature larvae to be one of the autapomorphous characters of the Keroplatidae, those of *Planarivora* are peripneustic. The existence of only two larval instars, the first one rather unusual in its morphological adaptations to parasitism, led me to think that the peripneustic condition of *Planarivora* could be interpreted as secondary and bound to its parasitic way of life. This interpretation is corroborated by the recent discovery by Platcher (1979) that in fact, at least in *Keroplatus testaceus*, the spiracles are present, although strongly reduced, unsclerotized and visible only under the scanning electron microscope. If this is the general state of the character, as it is likely, the apneustism of the larvae of the Keroplatidae is therefore deceptive, although the strongly reduced spiracles are probably unable to play a great role in respiration, the cuticular respiration remaining the most important. Anyway, the peripneustic condition of *Planarivora* can thus be easily explained by a secondary reopening and reinforcement of the spiracles, in connexion with the parasitism of the larvae.

Up to now, four species of *Planarivora* are known:

boracencis (Lane), 1950: 42 (*Ceroplatus*), comb. n. — Brazil.
enderleini (Lane), 1948: 443 (*Ceroplatus*), comb. n. — Brazil.
insignis (Hickman), 1965: 3 — New Zealand
nigricans (Lane), 1948: 444 (*Ceroplatus*), comb. n. — Brazil.

Of the so-called Neotropical "*Cerotelion*", only the two species described by Freeman (1951) from the Chilean subregion, *C. flavicornis* and *C. funereus*, are retained in this genus.

There is no great interest in discussing the signification of this New Zealand-Brazil distribution as long as the sister-group of *Planarivora* stays unknown (it can be either one genus of the *Asindulum-Xenoplatyura* group, or several, or the group itself). But it would be very interesting to ascertain whether the Brazilian *Planarivora* have the same biology than the New Zealand species or not. In fact, the main purpose of this paper is to draw this matter to the attention of the Brazilian students, both of Diptera and Planarians, in the hope that additional information is collected.

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REFERENCES

Edwards, F. W., 1929. Notes on the Ceroplatinae, with descriptions of new Australian species (Diptera, Mycetophilidae). Proc. Linn. Soc. N. S. W. 54: 162-175.

Hickman, V. V., 1965. On *Planarivora insignis* gen. et sp. n. (Diptera: Mycetophilidae) whose larval stages are parasitic in land Planarians. Pap. Proc. R. Soc. Tasm. 99: 1-8, 1 pl.

Lane, J., 1948. Ceroplatinae da Região Neotropical (Diptera, Mycetophilidae). Revta. Ent., Rio de J. 19: 437-458.

Lane, J., 1950. Neotropical Ceroplatinae (Diptera, Mycetophilidae). Dusenia, 1: 32-69.

Lane, J., 1958. Mycetophilidae, chiefly from Argentina. Proc. 10th Int. Congr. Ent. (Montreal, 1956) 1: 143-162.

Matile, L., 1978. Révision des *Truplaya* afrotropicaux (Diptera, Mycetophilidae). Annls. Soc. Ent. Fr. (N. S.), 14 (3): 451-477.

Matile, L. & Burghele-Balacesco, A., 1969. Note sur les genres *Keroplatus* et *Cerotelion* et description de *Cerotelion racovitzai*, sp. n. (Dipt. Mycetophilidae). Bull. Soc. Ent. Fr. 74 (3-4): 82-86.

Munroe, D. D., 1974. The systematics, phylogeny, and zoogeography of *Symmerus* Walker and *Australosymmerus* Freeman (Diptera: Mycetophilidae: Ditomyiinae). Mem. Ent. Soc. Can. 92. 183 p.

Papavero, N., 1978. Family Keroplatidae (Ceroplatidae, incl. Macroceridae). *In* Papavero, N. *ed.*, A Catalogue of the Diptera of the Americas South of the United States, 19C, 22 p.

Plachter, H., 1979. Zur Kenntnis der Präimaginalstadien der Pilzmücken (Diptera, Mycetophilioidea). Teil II: Eidonomie der Larven. Zool. Jb. Anat. 101: 271-392.